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BLISTER BEETLES

BY

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BLISTER BEETLES.

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In the Family Meloidæ there are several beetles, known popularly as Blister Beetles, some of which almost every year in Canada cause considerable anxiety to farmers and gardeners, from their habit of appearing suddenly and often much reducing the crop which they happen to attack. These blister beetles differ much in size and appearance, but all are soft-bodied insects, and in shape slender and cylindrical. Being gregarious in habit, they congregate in great numbers, and when they appear suddenly and attack a crop, the plants are often entirely ruined in two or three days. Fortunately, however, they oftentimes disappear from a locality as suddenly as they came.

As is well-known, blister beetles derived their popular name from their possessing powerful vesicating properties. Many cantharids have this property, but the species which has been used most extensively in medicine is the Spanish Beetle (*Cantharis vesicatoria*). Our common North American species, the Striped Blister Beetle (*Epicauta vittata*) has been found to be fully equal to the Spanish Beetle as a vesicant.

In their life-history, blister beetles differ remarkably from other coleoptera. Chittenden, in the United States Department of Agriculture Year Book, 1898, states:

> "The blister beetle eggs are laid on plants or upon the ground. From each hatches a small long-legged larva, called a 'triungulin,' which runs actively about in search of a grasshopper egg-pod, which it enters and feeds upon. After a time it casts its skin and assumes what is called the 'carabidoid' larval stage, and when it next moults it resembles a white grub, 'the scarabæidoid' larval stage. When a larva has finished its quota of locusts' eggs, it undergoes a third moult and forms within its own skin what is known as the 'coarctate' larval stage or 'pseudopupa,' and in this condition usually passes the winter. In the spring the fourth and ultimate larval moult takes place, and with the fifth moult the insect enters upon the true pupal stage, and in due time transforms to a beetle."

The Black Blister Beetle (*Epicauta pennsylvanica*, DeG.) (Fig. 1, on plate). This species is the one which, in Canada, has been most complained of. It occurs particularly in Ontario and the Eastern Provinces, but instances are on record of its appearing in destructive numbers in Manitoba, Saskatchewan and British Columbia. In colour, as its popular name implies, it is uniformly dull black, and in length varies from a little more than a quarter to slightly more than half an inch. This beetle has a very wide range of food plants. It is particularly destructive to the potato, and is mostly complained of as a pest of that plant. Mangels, beets, carrots, cabbages, tomatoes, corn and windsor beans are also freely attacked, and even such plants as mustard, asters, clematis, zinnia and other garden plants. Prof. E. W. Claypole has recorded the species as "devouring the flowers of the Great Rag-weed (*Ambrosia trifida*)." The species commonly occurs in August on the leaves and blossoms of golden rod and thoroughwort, and has also been found on amaranth and ironweed. At Ottawa, we have found the beetles defoliating clema-

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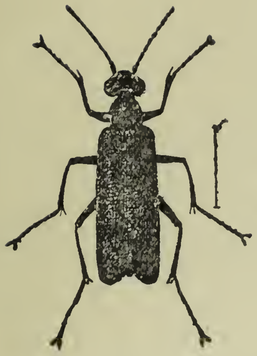
tis and plants of the genus *Thalictrum,* the latter growing in the perennial border at the Central Experimental Farm. At Aweme, Man., Mr. Norman Criddle finds the species wherever the Wild Pea (*Lathyrus venosus*) is plentiful. The beetles may be found in Ontario any time from the latter part of June to the end of September.

The Ash-gray Blister Beetle (*Macrobasis unicolor,* Kirby). (Fig. 6, on plate). This also is an abundant species, particularly in the east. It is larger than the Black Blister Beetle and in colour is of a uniform ash-gray. In size it varies from slightly less than half an inch to five-eighths of an inch. In New Brunswick the beetles have been very numerous during the month of July, eating the leaves of horse beans. In Quebec, the insect has attacked potatoes and beans. In Ontario the chief injury has also been to potatoes and beans. Other plants are often attacked by these beetles, such as peas, beets, tomato, sweet potato, clover, basswood, honey locust, lupine, astragalus, wild indigo, anemone, chrysanthemum, caragana, aralia, clematis, ironweed and thalictrum. At Ottawa the beetles have been frequently found upon the Tall Meadow Rue (*Thalictrum cornuti*). In the district we have found the adults from the beginning of the last week of June to the first week of August.

The Western Blister Beetle (Fig. 4, on plate), or, as it is also called, Nuttall's Blister Beetle (*Cantharis nuttalli,* Say), occurs throughout the west and is some years decidedly destructive to leguminous crops, particularly windsor broad beans. It is a handsome species and in length is from three-quarters to one inch. The wing-covers are variable in colour, some being purple, others greenish or of a coppery appearance. The head, thorax and body are metallic green, with a golden sheen. The time of the appearance of this blister beetle in destructive numbers varies considerably. During the past season the beetles appeared in large numbers in Saskatchewan from about the 25th July till the middle of August. Other years they appeared in swarms about July 1st and in 1893 at Saskatoon, Sask., they occurred as early as June 19th. Besides beans, the beetles have been found injuring young oats, barley, cultivated tares and leguminous wild plants such as *Vicia americana* and the astragali or milk vetches.

The Gray Blister Beetle (*Epicauta cinerea* Forst) (Fig. 2, on plate), has some years been destructive in Ontario and Quebec to potatoes, beans, vetch and alfalfa. It is also recorded as destructive to honey locust and even to the foliage of apple and the young fruit. It does not, however, occur nearly so destructively in Canada as some of the other species. In colour it is black, uniformly clothed with grey pubescence, and is from about three-eighths to five-eighths of an inch in length. The beetles occur in July and August.

The Margined Blister Beetle (*Epicauta marginata* Fab.). (Fig. 8, on plate.) The only Canadian specimens I have seen of this species are three which were taken at London, Ont., and which are in the collection of the Entomological Society of Ontario. This insect is very abundant in the United States and is recorded as being particularly partial to beets. It appears in July and August, and besides beets is known to have attacked beans, potatoes, tomatoes, asters, clematis, etc. In colour it is black, the head and sides of the thorax being clothed with gray pubescence, as are also the margins of the wing-covers. When at rest the inner gray borders of the wing-covers appear as a band down the centre of the back.



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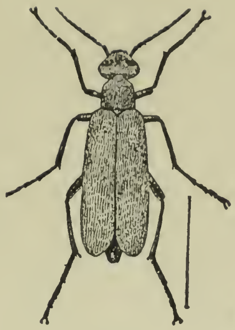

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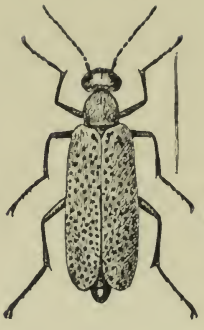

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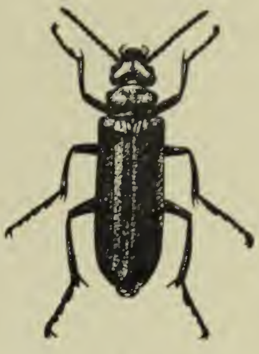

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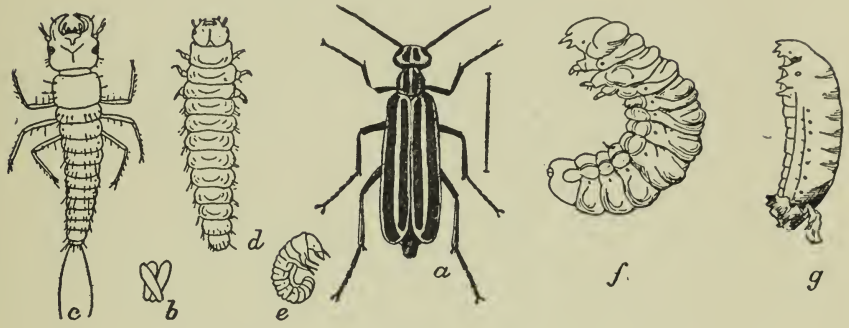

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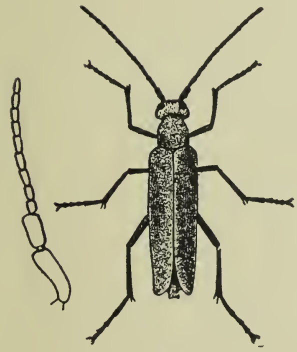

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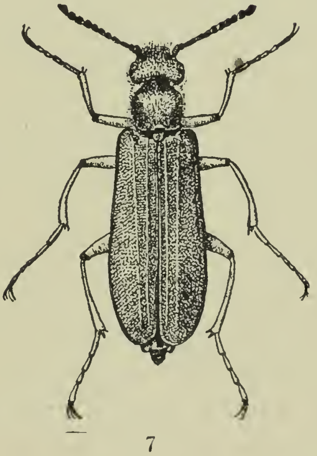

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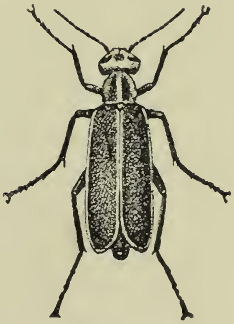

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BLISTER BEETLES

1—Black Blister Beetle.	5—Striped Blister Beetle.
2—Gray Blister Beetle.	6—Ash-gray Blister Beetle.
3—Spotted Blister Beetle.	7—Say's Blister Beetle.
4—Nuttall's Blister Beetle.	8—Margined Blister Beetle.

(Figs. 1, 2, 3, 4, 5, 6, 8, after Chittenden, Bull. No. 43, Div. of Ent., U. S. Dept- Agr.)
(Fig. 7 after Chittenden, Bull. No. 38, N. S., Div. of Ent., U. S. Dept. Agr.)

The Striped Blister Beetle (*Epicauta vittata* Fab.). (Fig. 5, on plate.) This species, which is about half an inch in length with blackish wing-covers, each of which is bordered with yellow and has a yellow stripe down the centre, has not as yet been complained of as a serious pest in Canada. In 1901, it was reported as injuring potatoes, tomatoes, mangels and beets in a few places in western Ontario, during the last week of July and the first week of August. Provancher records the species from St. Hyacinthe, Que. In the United States this beetle has long been known, particularly in the eastern States, as one of the most destructive pests of the potato. Besides the above-mentioned crops it has also been found doing injury to turnips, beans, peas, radishes, melons, corn, clover and alfalfa.

The Spotted Blister Beetle (*Epicauta maculata* Say.). (Fig. 3, on plate.) In British Columbia and some of the other western provinces this blister beetle has been frequently complained of. In colour it is gray, or rather the black body is covered with fine gray hairs, excepting small areas on the wing covers which show up as black spots. The beetles appear any time from about the middle of May till the middle of August. Injury by this species has been done particularly to potatoes, but it has also done considerable damage to beets, cabbages, spinach, beans and clover. It is also known to feed in Montana upon the Grease-wood, *Sarcobatus vermiculatus*.

Say's Blister Beetle (*Pomphopoea sayi* Lec.) (Fig. 7, on plate.) This species has not yet been recorded as an important pest in Canada. It, unlike the above-mentioned species, is arboreal, feeding on the blossoms of certain trees. At Toronto, Mr. C. W. Nash has reported that the beetles did considerable damage to the blossoms of plum, in May. During the past season the adults were present in some numbers on June 4th at Hull, Que., where Mr. W. Metcalfe found them feeding on the blossoms of elder. Mr. F. J. A. Morris collected the species on July 1st, in Muskoka, Ont., upon Nannyberry (*Viburnum lentago*). Mr. J. D. Evans has taken the beetles at Sudbury, Ont., on May 14th, Mr. A. W. Hanham has found the species at Quebec, Que., and Mr. A. F. Winn has collected the beetle at Shawbridge, Que., on June 4th. Mr. Winn informs me that he has also found specimens at other points in the Laurentian Mountain district, in the blossoms of cherry, plum, etc. This is a handsome species measuring about seven-eighths of an inch in length. In colour it is of a dark metallic blue, the first two joints of the legs being reddish-yellow.

The Green Blister Beetle, *Cantharis cyanipennis* Say. Few instances are on record of this species occurring in destructive numbers in Canada. In 1900 the beetles were found injuring pea vines in an orchard at Ducks, B.C.. and in 1904 specimens were sent to the Division with the statement that they were destroying beans and peas. No further record of injury by them has since been received. "At several places in Western Assiniboia and Southern Alberta", the beetles have been found by Fletcher feeding on the wild American vetch. This species is a large one, some individuals being three-quarters of an inch in length; in colour it varies from an intense green to almost a deep blue with metallic reflections.

Other species of cantharids which occur in Canada but which so far have not appeared in injurious numbers, are the following:

EPICAUTA SERICANS Lec. This species, some years, occurs in large numbers in Manitoba. Mr. N. Criddle states that at Aweme, Man., where it is present on the dry prairies, that it is in no way injurious, but that, on the contrary, it is beneficial, as it seems to confine itself almost entirely to lambs' quarters. The native food plant is apparently the Crocus Anemone, *Anemone nuttalliana,* on which Mr. Criddle has frequently found the adults feeding. This is a small grayish species about three-eights of an inch in length.

EPICAUTA PUNCTICOLLIS Mann. In British Columbia this species is sometimes fairly abundant. Rev. G. W. Taylor has found the beetles on Vancouver Island, and Mr. A. J. Hill has collected specimens at New Westminster.

EPICAUTA FISSILABUS Lec. This species has been collected on June 6, at Saskatoon, Sask., by Mr. T. N. Willing.

EPICAUTA TRICHUS Pall. Mr. Norman Criddle has collected this species at Aweme, Man., (June 19, 21).

CANTHARIS VIRIDANA Lec. Fletcher has taken this species at Aweme, Man., in the middle of July, at Rudy, Sask., in the same month, and also at Medicine Hat, Alta., on June 20th. This species measures about half an inch in length. It is of a green or bluish-green colour, the head and thorax having a metallic coppery reflection.

CANTHARIS SPHÆRICOLLIS Say. This blister beetle is some years rather abundant in British Columbia. We have had it sent in, in fair numbers, from near Kamloops, B.C. (July 31), and also from Vernon, B.C. It is greenish-blue in colour and in length about half an inch.

CANTHARIS COOPERI Lec. A series of this beetle was sent to the Division some years ago, from Indian Head, Sask. It is very distinct from any of the above species, the wing covers being black and the head and thorax reddish-yellow.

REMEDIES.

In the older provinces, where potatoes are so largely grown, little injury from the attacks of blister beetles should result if the vines are sprayed regularly with the ordinary poisoned Bordeaux mixture* so widely used for fungi and leaf-eating insects. In the western provinces, however, where fortunately the Colorado Potato Beetle does not yet occur in very destructive numbers, no regular treatment of potato fields is practised, and consequently when these beetles appear suddenly in large swarms, the damage is done, in many instances before the farmer knows that the insects are upon his crop. As is well known, blister beetles, in their larval state,

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* Bordeaux mixture is made as follows:—

Copper sulphate (blue-stone)	4 lbs.
Lime (fresh)	4 lbs.
Paris green	4 oz
Water (1 barrel)	40 gallons

Dissolve the copper sulphate (by suspending it inside a wooden or earthen vessel containing 4 or 5 or more gallons of water). Slake the lime in another vessel. If the lime, when slaked is lumpy or granular, it should be strained through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place; half fill the barrel with water, add the slaked lime, fill tne barrel with water and stir thoroughly. It is then ready for use.

A stock solution of copper sulphate and milk of lime may be prepared and kept in separate covered barrels throughout the spraying season. The quantities of copper sulphate, lime and water should be carefully noted.

are predaceous on the eggs of grasshoppers. It is well, therefore that the farmer should realize this and watch for the appearance of blister beetles in years following excessive outbreaks of grasshoppers. Whenever these latter insects appear in destructive numbeers, the now well-known Criddle mixture† should be applied. This has given excellent results particularly in Manitoba and the west. When the grasshoppers are destroyed in this manner, the chances are, of course, that blister beetles will not be present in numbers to do very serious damage the following year. When spraying crops with an arsenical mixture for the destruction of blister beetles it is important that the mixture be applied immediately their presence is detected, on account of the voracious habits of these insects. Paris green, the insecticide which has been mostly used, can be applied either as a spray, using one ounce to every ten gallons of water, to which has been added an equal quantity of freshly-slaked lime, or as a dry application mixed with from 10 to 20 parts of flour, land plaster or slaked lime. Plants with such coarse foliage as the potato will stand double the above strengths of Paris green. In some outbreaks it may be necessary to repeat the application, as the beetles which are killed are soon replaced by others.

Blister beetles are very easily disturbed and for this reason a remedy which has often been very successfully employed is for two or three boys, or more if necessary, to walk through an infested field and wave from side to side boughs of spruce, or other branches. Such an operation will drive the beetles ahead of them and when the insects come to the edge of the crop they will disperse and seldom return. This method has given excellent results in outbreaks of the Western Blister Beetle. This latter species is particularly ravenous and is capable of destroying a crop in a very short time, even in a day according to some reports. In such instances, of course, spraying would be of little avail. In the United States the beetles are often driven in the above manner into a windrow of hay or straw which is immediately set on fire, and thousands of the insects are thus destroyed.

In gardens many of these beetles may be killed by beating them from the plants into pans containing water with a little coal oil on the surface. If any of the species which feed on the blossoms of fruit or other trees should occur in injurious numbers, many no doubt could be jarred from the trees into an inverted umbrella, or other contrivance, and then put into a vessel containing coal oil and water.

On account of the good habits of the larvæ of blister beetles in feeding upon the eggs of grasshoppers, it is often undesirable to destroy them, but, of course, when they occur in destructive numbers, it is well that one of the above measures be taken as soon as possible for the protection of the crop.

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†The Criddle mixture is made by mixing one pound of Paris green with five ordinary pailfuls of horse droppings, which have been moistened with about half a pailful of water in which two pounds of salt has been dissolved. It is simply scattered among the crop which is being attacked, or along the edge of a crop towards which the young grasshoppers are working.

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